

## REMARKS

Claims 1 to 10 and 12-20 are under consideration. Claims 1, 2, and 7 have been amended. No new matter is added. Reconsideration of claims 1-10 and 12-20 is respectfully requested. Claim 11 is cancelled.

### Rejections Under 35 U.S.C. 112

Claims 7-10 and 20 were rejected under 35 U.S.C. 112, second paragraph as being indefinite, in reference to the term “rapid growth” in claim 7.

In response, claim 7 has been amended to more particularly claim the invention. Therefore, the above rejection of claim 7 and dependent claims 8-10 and 20 should be withdrawn.

### Rejection Under 35 U.S.C. 103

The Action rejected claims 1-10, 12-15 and 17-20 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,358,858 to Meng et al in view of U.S. Patent No. 3,195,271 to Golueke et al.

Regarding claims 7,9 and 10, The Action states that:

*Meng teaches a method of cultivating seaweeds in land based sea water ponds by producing spores and sporelings in cultures maintained in a laboratory facility (Meng Col 2 line 22); Growing the sporelings in a suspension culture under optimal growth conditions (Meng Col. 2 line 25-26); Transferring the matured sporelings to large cultivation tanks that are aerated (Meng Col. 3 line 21 “fresh air”) to allow rapid growth (Meng Col. 2 line 39); and Harvesting; drying; and grinding (Meng Col 2 line 4-6) to result in a product for human consumption or pharmaceutical use (Meng Col 1 line 13)*

The Action admits “Meng is silent on a plurality of cultivation tanks and the use of seawater as a medium” (emphasis added) but concludes that “*it would have been obvious to one of ordinary skill in the*

*art to modify the teachings of Meng at the time of the invention with a plurality of tanks since the modification is merely the duplication of a known element for a multiple effect performing the same intended function-Modified to increase production yields. This limitation does not present a patentably distinct limitation over the prior art. In re Harza, 274 F 2d 669,671, 124 USPQ 378, 380 (CCPA 1960). ”*

In response, applicant disagrees with the rejection but applicant has amended claim 7 to 1) more particularly claim that the rapid growth yields of about 1 kg/m<sup>2</sup>/week, 2) use of a plurality of large cultivation tanks containing seawateraerated with air, and 3) in land based sea water ponds. In contrast, Meng does not describe or suggest: 1) “a plurality of tanks” (an important element in considering methods for production at small scale versus large scale), and 2) Meng describes cultivation of the conchocelis filaments (and not the blade stage of gametophytic stage of the present invention) in Petri dishes in laboratory conditions indoors and not in outdoor conditions which are difficult to control, and 3) the SWM-3 medium that Meng uses cannot be used outdoors because the medium is expensive for large scale seaweed cultivation and because the containers would get contaminated with epiphytes outdoors. Examples 1, 6 and 11 describe indoor growth conditions for temperature, photoperiod and light intensities. These conditions are laboratory controlled and suitable for small scale growth of conchocelis filaments of Porphyra and cannot be merely duplicated for large scale growth of blades of gametophytic stage Porphyra of the present invention in out door conditions. In other words, Meng describes indoor cultivation conditions which are very different from those required outdoors especially as they relate to temperature, illumination intensities, and contamination hazards.

The Examiner’s reliance on In re Harza (supra) is therefore misplaced when concluding that “*it would have been obvious to one of ordinary skill in the art to modify the teachings of*

*Meng at the time of the invention with a plurality of tanks since the modification is merely the duplication of a known element for a multiple effect performing the same intended function-Modified to increase production yields. (emphasis added) In re Harza, 274 F 2d 669,671, 124 USPQ 378, 380 (CCPA 1960)."*

This is because as enumerated above, it is not merely a question of using more pertri dishes, but the conditions of the cultivation process are very different indoors compared with outdoors. Also, besides the tanks, there are multiple elements that distinguish the present invention from Meng.

In In re Harza, claims at issue were directed to a water-tight structure wherein a water seal of flexible material fills the joints , and the seal has a ‘web” which lies \*\* in the joint, plurality of “ribs” \*\* .... The prior art disclosed a flexible water stop for preventing passage of water between masses of concrete in the shape of a plus sign (+). Although the reference did not disclose a plurality of ribs, the court held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced (emphasis added).

Since the present invention does NOT duplicate Meng’s laboratory Petri dishes and laboratory conditions, and since the present invention has the unexpected result of producing rapid yields of about 1 kg/m<sup>2</sup>/week of Porphyra, as a matter of law, the above rejection cannot be sustained. Under In re Harza, the above rejection should be withdrawn.

The Action then continues to state that "Golueke teaches that it is old and notoriously well-known to cultivate the seaweed in seawater that is aerated (Gouleke Col 1 line 67 and Col. 2 line 33). It would have been obvious... to further modify the teachings of Meng with the teachings of Golueke at the time of the invention since the salinity is known to promote desired seaweed development and to inhibit the growth of other undesired algae as taught by Golueke (Golueke Col 2. line 6). One of ordinary skill in the art would be

*motivated to modify the teachings of Meng with the teachings of Gouleke also based the location of the facility and readily available abundance of seawater.”*

In response, applicant disagrees. This is because Golueke describes the growth of micro-red algae, particularly *Porphyridium cruentum*, NOT *Porphyra* seaweed (macro algae). The micro-algae in Golueke remain in the same tank during the entire cultivation process.

The cited sections from Golueke- Col 1 line 67 to Col 2 line 6 are reproduced: “*The raw sea water can be directly utilized, but it is preferred that it first be passed through a filter 10 in order to mechanically remove any contained detritus and so that it is reasonably clean and clear. The seawater can be directly utilized with its normal salinity, and we have found that in the culture of *Porphyridium cruentum* the salinity of the culture medium should be maintained at the value at least of sea water. In fact it is preferred to increase the salinity and consequently the density of the liquid medium above that of ordinary sea water since this leads to inhibit growth of other undesired algae”*

Based upon the above citation, the Action concludes that “*One of ordinary skill in the art would be motivated to modify the teachings of Meng with the teachings of Gouleke also based the location of the facility and readily available abundance of seawater.”*

In response, applicant disagrees with the above rejection based on Meng et al and Golueke et al. Applicant’s invention does not depend on the location of the facility and salinity of the culture to grow red algae. Applicant’s invention involves land based sea water ponds that do not require to be located near the sea water source and the invention has no relevance to growth of red algae for production of carageenin

Applicant disagrees with the above rejections because they are untenable as a matter of patent law. As discussed above, when applying 35 USC 103, the following tenets of patent law must be adhered to: (A) The claimed invention must be considered as a whole;

(B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination, (C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention, and (D) Reasonable expectation of success is the standard with which obviousness is determined.

Hodosh v. Block Drug Co., Inc., 786 F.2d 1136, 1143 n.5, 1986. MPEP 2141.

None of the factors A to D above, are present here. Therefore, the rejection of claims 7, 9, and 10 must be withdrawn.

The Action states:

*Regarding claim 20, Meng as modified teaches the seaweed product of porphyra (Meng Col. 1 line 31 and Col 4 line 66).*

In response, applicant disagrees. Applicant's invention does not include involve Porphyra angusta growth for the production of phycoerythrin . Therefore, as a matter of fact, there is no basis for the above rejection and it should be withdrawn.

The Action states

*-Regarding Claim 1, a) Meng teaches a system for land based cultivation of seaweeds by phycological laboratory facilities suitable to produce spores and sporelings in cultures (Meng Col.3 line 6 and Col.4 line 65-66); -a plurality of sleeve (Meng Col.2 line 31) housed in temperature and controlled land based facilities to allow the maturation of the sporelings (Meng Col. 1 line 66-68); -a plurality of small aerated inoculation tanks (Meng Col 2 line 34) enriched with defined nutrients under optimal conditions, to allow the mature sporelings to grow into seaweed pieces; and a plurality of large aerated cultivation tanks to transfer the seaweed pieces into to grow to full size (Meng Col 2 line 40).*

The Action further states that b) Meng teaches the importance of aeration, but is silent on the use of seawater and aeration beginning at the culturing phase. How ever, "Golueke teaches that it is old and

*notoriously well-known to cultivate the seaweed in seawater that is aerated (Gouleke Col 1 line 67 and Fig 1 #21). It would have been obvious... to further modify the teachings of Meng with the teachings of Golueke at the time of the invention for a means of providing ideal artificial growth conditions by simulating some of the natural environmental conditions in which sea weed grows.*

The Action admits that c) "Meng is silent on the plurality of tanks. However, it would have been obvious to modify teachings of Meng at the time of the invention by a mere duplication of an element for a multiple effect performing the same intended function. The plurality of tanks enables mass production in a cost effective manner and enables one to control different environmental conditions, stages of development, and nutrients in various tanks."

In response, applicant disagrees.

In reference to a), b) and c) above Meng describes cultivation of seaweed in perti dishes using the SWM-3 medium under laboratory conditions on a small scale. Meng does not teach a plurality of large cultivation tanks containing seawater aerated with air, and in outdoor conditions which are difficult to control. Meng's Examples 1, 6 and 11 describe indoor growth conditions for temperature, photoperiod and light intensities. These conditions are laboratory controlled and suitable for small scale growth of conchocelis filaments of Porphyra (micro-algae) and CANNOT be duplicated for large scale growth of blades of gametophytic stage Porphyra (macro-algae) of the present invention in out door conditions. In other words, Meng describes indoor cultivation conditions which are very different from those required outdoors especially as they relate to temperature, illumination intensities, and contamination hazards.

The cited section from Golueke- Col 1 line 67 is reproduced: "The raw sea water can be directly utilized, but it is preferred that it first be passed through a filter 10 in order to mechanically remove any contained detritus and so that it is reasonably clean and clear."

FIG. 1., #21 indicates a carbondioxide source. In the specification, Col 2, line 61, Golueke describes that “While the alga can obtain its carbondioxide requirement from the atmosphere and from the breakdown of the sewage, it is sometimes desired to add carbon dioxide from a separate source 21.” Therefore, as a matter of fact, the above cited sections of Golueke teaches away from the present invention. This is because the present invention does not use carbondioxide for aeration but air. See specification page 15, lines 14-16.

There is no basis for the above rejection and it should be withdrawn.

Applicant has amended claim1 to clearly point out that the sea water is aerated with air. As to the Examiner’s contention that Golueke is cited for using sea water and not for use of sewage, applicant submits that Golueke’s sea water is bubbled with carbondioxide and NOT air.

On page 11 of the Action, in the section “Examiner’s Response to Arguments”, the Examiner contends that her conclusion of obviousness is not based on improper hindsight but on knowledge which was within the level of ordinary skill at the time of the claimed invention was made, and does not include knowledge gleaned only from the applicant’s disclosure. She maintains that the modifications made to the main teachings of Meng are obvious modification for one of ordinary skill in the art based on accepted wisdom in the art and are not gleaned from applicant’s disclosure. She states that the teachings of Golueke are provided as a secondary reference to illustrate the accepted wisdom in the field. The Action states:

*“Golueke is cited merely to teach that it is old and notoriously well-known to cultivate the seaweed in seawater and that there is known success in culturing in seawater and that it is known to produce seaweed on a commercial scale. It is irrelevant whether Golueke teaches the addition of sewage. The addition of sewage*

*is merely the selection of an additional nutrient source. Changes to sizes and concentrations that easily derived through routine tests and experimentation do not present patentably distinct limitations.”*

In response, applicant disagrees as a matter of fact and pursuant to MPEP and case law. Although the Examiner has responded above to applicant’s argument for having applied “improper hindsight” in the Office Action of 11/1/2004, the examiner has not responded to applicant’s argument that 1) a prior art reference to be considered in its entirety, and 2) the likelihood of success of the claimed combination described in the prior art. For example, in the response filed on 11/18/2004, Applicant argued:

“Applicant refers to MPEP 2141.02 and specifically points out that in determining the differences between the prior art and the claims, the question under 35 USC 103, is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. Stratoflex, Inc. v. Aeroquip Corp. 713 F. 2d 1530 218 USPQ 871 (Fed. Cir. 1983).

Moreover, the prior art reference must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be found in the prior art, and not based on applicant’s disclosure. In re Vaeck 947 F. 2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (MPEP §2143).

The Federal Circuit, in reference to references cited in an obviousness rejection, has held that: “The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention.” Hodosh v. Block Drug Co., Inc., 786 F.2d 1136, 1143 n.5, 1986 MPEP 2141.”

Importantly, a prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. W.I. Gore & Associates, Inc v. Garlock Inc 721 F2d 1540, 220 USPQ 303 (Fed Cir 1983), cert denied 469 US 851 (1984). In this regard, the Examiner’s following two statements are in direct

violation of the above Federal Circuit precedent: *It is irrelevant whether Golueke teaches the addition of sewage. The addition of sewage is merely the selection of an additional nutrient source.*

This is because it is very relevant that Golueke teaches addition of sewage because this essential element (Golueke, Col 2, lines 33 to 45) teaches away from the present invention, in which the requirement of sewage in cultures is eliminated. According to Schneck v. Norton Corp, 713 F2d 782, 785; 218 USPQ 698,700 (Fed Cir. 1983), “Because that insight was contrary to the understandings and expectations of the art, the structure effectuating it would not have been obvious to those skilled in the art.” In the instant case the Examiner states that the teachings of Golueke are provided as a secondary reference to illustrate the accepted wisdom in the field. As a result, the wisdom in the field at the time the present invention was made would not have found the combination of Meng et al, and Golueke et al to render the invention obvious. Therefore, the above rejection of claim 1 should be withdrawn.

The Action states, *regarding Claim 2 that Meng as modified teaches a land based technology comprising a seeding unit producing spores (Meng Col 3 line 6); sporeling production unit (Meng Col 3 line 11); maturation unit (Meng Col 3 line 16); cultivation unit (Meng Col 3, line 20); harvesting; drying; and grinding (Meng Col 2 line 4-6).*

In response, applicant disagrees, but in the interest of seeking allowance of Claim 2, applicant has amended claim 2 to distinguish that the present invention includes seawater aerated with air and enriched with nutrients including suitable amounts of ammonium chloride and sodium phosphate. Therefore, there is no basis to sustain the above rejection over modified Meng for these reasons, as well as reasons presented above for claim 1.

The Action States:

*Regarding Claim 3, Meng as modified teaches the seaweed species grown in land based seawater ponds is Porphyra (Meng Col 1, line 31).*

*Regarding Claim 4, Meng as modified teaches the nutrients added to the seawater are designed to produce a plurality of seaweeds that are used as neutraceuticals, food components, pharmaceutics or cosmetics (Meng Col 1, line 13).*

*Regarding Claim 5, Meng as modified teaches production of spores in petri dishes (Men Col.3 line 6); cultivation of sporelings in sleeves under environmentally controlled conditions (MengCol 3 line 16); growth in small and large tanks (Meng Col 3 line 20 an Col 2 line 34-41).Meng is silent on separating the inoculation and harvesting into separate ponds. However, it would have been obvious to one of ordinary skill in the art to modify the teachings at the time of the invention since the modification is merely the separation of known steps into replicated ponds for the efficient management of the system of having a continuous production at different stages and for more control over the environmental conditions at particular points in production.*

*Regarding Claim 6, Meng as modified is inherently programmable for production throughout the year since Meng teaches controlling the light and the temperature conditions for the cultivating seaweed.*

*Regarding Claim 8, Meng as modified teaches the large cultivation tank contains suitable nutrients to ensure high yields of seaweed products (Golueke Col 2 line 34).*

In response, applicant disagrees the above rejections of claims 3-8, under 35 U.S.S. 103(a). First, applicant refers to the reasons presented for claim 1 to overcome the combination of Meng and Golueke (“modified Meng”). Golueke teaches away from the present invention in reference to use of sewage. Second, because of the differences in the

systems and conditions for the mass production of Porphyra outdoors between the present invention and Meng's small scale production under laboratory conditions, the present product Porphyra and its uses are different as a matter of fact in the present invention.

As to claim 8, Golueke, specifically states that in addition to the added salts, micro elements and nutrients, it is essential to add sewage. See Col 2, lines 34-37. In contrast, the present invention does not require sewage. Federal Circuit case law does not permit selective consideration of a prior art reference.

Thus as a matter of fact and law, there is no basis to sustain the above rejection of claims 3 to 8 and this rejection should be withdrawn.

The Action states:

*Regarding Claim 11, 13 and 17, Meng as modified is silent on the small aerated inoculation tanks have the volume capacity of about 40 liters, and the large aerated cultivation tanks have the volume capacity of about 4000 liters; varying sizes including 30- 500 m<sup>2</sup>. or the volume capacity of each of the sleeves is about 20 liters, of the tanks used in stage 1, is about 40 liters, of the large tanks used in stage 2 is about 4000 liters, of inoculation ponds in stage 3 is about 30 m<sup>2</sup> and the cultivation ponds used in stage 4 ponds of 500 m<sup>2</sup>. It would have been obvious to one of ordinary skill in the art to modify the teachings of at the time of the invention through routine tests and experimentation for efficient and optimized production ....land base.*

*Regarding claim 12, Meng as modified teaches the importance of nutrients (Golueke Col 2, line 34) and N:P nutrients are notoriously well known fertilizers, but Meng is silent on seawater being enriched with 0.5 mM NH4Cl and 0.05 mM Na<sub>2</sub>PO<sub>4</sub>, at least two times a week for at least three weeks. It would have been obvious to one of ordinary skill in the art to modify the teachings at the time of the invention through routine laboratory tests and experimentation to derive the desired fertilizer application quantity and frequency based on different seasons of the year or the seaweeds developmental stage."*

Regarding claim 14, Meng as modified teaches the drying unit comprises centrifugation drums or low temperature ovens (Meng Col 2 line 49).

Regarding claim 15, Meng as modified teaches the seaweed species grown in land based seawater ponds include Porphyra (Meng 1 line 31)

Regarding claims 18 and 19, Meng as modified teaches the seaweed product of Porphyra (Meng Col 1 line 31 and Col 4 line 66)

In response, Applicant disagrees with the above rejections of claims 11-15 and 17 -19 because they are untenable as a matter of patent law. Claim 11 is cancelled. Remaining claims are dependent on claim 1. The discussion in reference to claim 1 above, applies here. In addition, when applying 35 USC 103, the following tenets of patent law must be adhered to: (A) The claimed invention must be considered as a whole; (B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination, (C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention, and (D) Reasonable expectation of success is the standard with which obviousness is determined. Hodosh v. Block Drug Co., Inc., 786 F.2d 1136, 1143 n.5, 1986 MPEP 2141.

None of the factors A to D above, are present here. Moreover, applicant has submitted reasons in the section on Claim 1, to overcome the “modified Meng” argument. Therefore, as a matter of fact and law, the above rejection of claims 12-19 should be withdrawn.

The Action states: “*Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No 5,358,858 to Meng et al in view of U.S. Patent No*

*3,195,271 to Golueke et al as applied to claim 1 above and further in view of Techniques of Laboratory Cultivation of marine Algae, University of South Florida, St Petersburg Dept of Marine Science, Nov 1983, page 42, 6, 7, 1 and 40....Meng as modified teaches the land based temperature controlled facility housing the plurality of sleeves, but does not implicitly teach a [comprises] chiller to regulate the temperature (Meng Col 4 line 68 and Col 3 line 123). However Techniques... teaches that chillers are old and notoriously well known selected pieces of equipment to achieve desired controlled temperature(Techniques ... pg 40)....the modification is merely the selection of a known mechanical equipment for [means] energy efficient means of achieving the controlled temperatures.*

In response, applicant disagrees. Applicant refers to the response above, on page --, in reference to rejection of claim 1 based on combination of Meng et al and Golueke. Claim 16 is dependent on claim 1, and therefore includes elements which are not merely duplicative of the prior art references. The combination of these two references with Techniques of Laboratory Cultivation of marine algae, does not render claim 16 obvious, because the third reference deals with laboratory based growth marine algae having equipment to control temperature. The above rejection should be withdrawn.

#### **Examiner's Response to Arguments in Amendment under Final filed 11/18/2004**

Regarding claim 7, the statement of “to allow rapid growth” was considered too broad. In response, applicant has amended claim 7. No new matter is added, since support for “yields of about 1 Kg/m<sup>2</sup>/week was found on page 11, line 5 of the specification.

In reference to the use of “aeration”, the Action states that the recitation does not exclude carbondioxide. In response, applicant has amended claims 1 and 7 and dependent claims thereof, to more specifically state that “sea water is aerated with air”.

The language of claim 1 and 2 included "optionally". This term is deleted.

Applicant thanks the Examiner for her constructive suggestions to make the claims allowable.

Respectfully submitted,



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